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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/762,599	01/21/2004	Takahiro Matsumoto	1232-5256	5047
27123	7590	04/06/2006	EXAMINER	
MORGAN & FINNEGAN, L.L.P. 3 WORLD FINANCIAL CENTER NEW YORK, NY 10281-2101			UNDERWOOD, JARREAS C	
			ART UNIT	PAPER NUMBER
			2877	

DATE MAILED: 04/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/762,599

Applicant(s)

MATSUMOTO, TAKAHIRO

Examiner

Jarreas C. Underwood

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 January 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) _____ is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8, 10 and 11 is/are rejected.
- 7) ☒ Claim(s) 9 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 21 November 2005.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities:

Elements 58 through 64 do not appear on any figure. It is recommended the applicant use elements 18 through 24 as described on page 10-11.

There are multiple references to mark element 31, which does not appear on any figure. It is recommended the applicant include a statement generalizing reference numerals 31A and 31B (such as on page 11, lines 19-20).

Appropriate correction is required.

Claim Objections

2. Claim 9 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Recitation of an exposure apparatus is in the preamble of the claim and is not given patentable weight in that no details of the structure or function of the apparatus have been recited in the body of the claim.

3. Claims 10-11 are objected to because of the following informalities: the word "shot" is indeterminate. The phrase "exposure shot" should be used.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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5. Claims 1-6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "randomness" in claim 1 is a relative term that renders the claim indefinite. The term "randomness" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably appraised of the scope of the invention. It would be possible to evaluate multiple quantities in the evaluation step, each of which could be considered non-linear. For purposes of examination the examiner defines "randomness" as "variation in the position" referring to the uncertainty in the location of the alignment marks.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-2, 10-11 are rejected under 35 U.S.C. 102(b) as being anticipated by Magome et al (U.S. Patent 5,805,866).

8. As to claim 1, Magome discloses a method for detecting disposition of plurality of exposure shot areas of an object that is to be exposed, said method comprising:

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a first detection step of detecting the alignment marks on the object
(column 1, lines 64-65);

an evaluation step of evaluating randomness of alignment marks based on
said first detection step (column 2 lines 1-4);

a determination step of determining a number smaller than total number of
alignment marks on the object based on the evaluation result by said evaluation
step (column 2, lines 12-17); and

a second detection step detecting the disposition of the plurality of
exposure shot areas by detecting alignment marks corresponding the number
determining a number of alignment marks on evaluation result by said
determined by said determination step (column 2, lines 21-26).

9. As to claim 2, Magome discloses everything claimed, as applied above, in
addition said evaluation step evaluates positional detection accuracy of the
alignment marks based on the detection result said first detection step (column
17, lines 50-64).

10. As to claim 11, Magome discloses an overlay inspection apparatus for
inspecting an overlay state between first and second patterns for plural shots, a
film being formed on the first pattern, and the second pattern being formed on the
film, said overlay inspection apparatus comprising:

a detector for detecting a measurement mark corresponding to the shot
(element 26X); and

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a controller for determining the number (Ns) of necessary shots for satisfying required detection the shot; and accuracy based on a detection result by said detector of the measurement marks (column 14).

11. As to claim 10, the apparatus of claim 11 is able to perform all the method steps as claimed.

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

13. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Magome in view of Johannsmeier (U.S. Patent 4,070,117).

Magome discloses everything claimed, as applied above, with the exception of plural mark elements, however to do so is taught by Johannsmeier.

Johannsmeier discloses plural mark elements (Figure 2) and evaluates the interval between the mark elements (column 2 lines 41-55).

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It would have been obvious to one having ordinary skill in the art at the time of invention to evaluate the interval between multiple mark elements in order to measure the alignment of the alignment patterns on the mask with the corresponding alignment patterns on the wafer.

14. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Magome in view of Nishi (U.S. Patent 6,411,386).

Magome discloses everything claimed, as applied above, with the exception of plural mark elements and an evaluation step including the steps of: calculating a difference between an average among measurement values of positions of all the mark elements, and the measurement value of the position of the mark element; and calculating reproducibility of the difference, however to do so is taught by Nishi.

Nishi discloses the use of plural mark elements (Figures 2a and 2b) and an evaluation step including the steps of: calculating a difference between an average among measurement values of positions of all the mark elements, and the measurement value of the position of the mark element; and calculating reproducibility of the difference (column 3, lines 41-46).

It would have been obvious to one having ordinary skill in the art at the time of invention to employ plural mark elements and statistically process the coordinate positions in order to compute the linear error of the actual coordinates of each of the plurality of shot regions from the design coordinates.

15. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nakagawa (U.S. Patent 5,859,707) in view of Nishi.

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As to claim 7, Nakagawa discloses an apparatus for detecting dispositions of a plurality of exposure shot areas of an object that is to be exposed, said apparatus comprising:

- a detector for detecting the alignment marks on the object (column 3, lines 22-25);

- a processor for evaluating randomness of the alignment marks based on the detection result by said detector (column 3, lines 45-49);

- a second detector for detecting the dispositions of the plurality of exposure shot areas by detecting alignment marks corresponding the number determined by the controller (column 3, lines 39-44).

Nakagawa fails to disclose a controller for determining a number smaller than the total number of alignment marks on the object, however to do so is taught by Nishi.

Nishi discloses it is possible to determine a number smaller than the total number of alignment marks on the object (column 2, lines 59-67 and column 3 lines 1-46).

It would have been obvious to one having ordinary skill in the art at the time of invention to include a controller for determining a reduced number of measurement marks in order to decrease the processing time, without impairing the measuring accuracy.

16. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nakagawa in view of Nishi as applied to claim 7 above, and further in view of Jang et al (U.S. Patent 5,740,065).

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Nakagawa in view of Nishi discloses everything claimed, as applied above, with the exception of an input part for inputting required alignment accuracy, however to do so is taught by Jang.

Jang discloses an input part for inputting required alignment accuracy (column 4 lines 13-18).

It would have been obvious to one having ordinary skill in the art at the time of invention to include an input part to find the optimal conditions of the alignment and exposure process.

Allowable Subject Matter

17. Claims 4-5 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

18. The following is a statement of reasons for the indication of allowable subject matter: the prior art of record, taken alone or in combination, fails to disclose or render obvious a determination step that determines a minimum natural number N_s that meets (claim 4) $N_s \geq \alpha \cdot (M_r / A_r)^2 / N_m$, where M_r is reproducibility of the interval between the mark elements, N_m is the number of mark elements included in each alignment mark, A_r is required accuracy, and α ($1 \leq \alpha \leq 3$) is a corrective coefficient, in combination with the rest of claim 3.

19. As to claim 5, the prior art of record, taken alone or in combination, fails to disclose or render obvious a determination step that determines a minimum natural number N_s that meets (claim 5) $N_s \geq \alpha \cdot f(N_m, M_r, A_r)$, where M_r is reproducibility of the interval between the mark elements, N_m is the number of

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mark elements included in each alignment mark, A_r is required accuracy, and α ($1 \leq \alpha \leq 3$) is a corrective coefficient, and f is a predetermined function, in combination with the rest of claim 3.

Conclusion

20. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Kuroki et al (U.S. Patent 4,545,684); Shiraishi (U.S. Patent 6,483,571);
Taniguchi (U.S. Patent 6,333,776)

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jarreas C. Underwood whose telephone number is (575) 272-1536. The examiner can normally be reached on Monday-Friday 0800-1630.

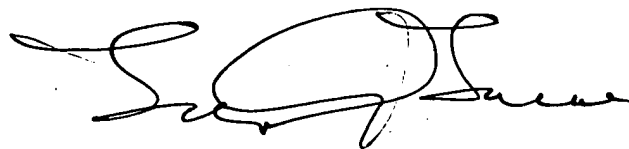
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley can be reached on (571) 272-2059. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jarreas Underwood
Patent Examiner
Art Unit 2877
27 March, 2006

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LAYLA G. LAUCHMAN
PRIMARY EXAMINER